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Natural Gas Supply, Strategy & Resource Development Plans; Results of NELP-I & II; NELP-III & Future Exploration Licensing Rounds

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By

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DGH

Presentation Outline

A. Natural Gas Supply/Demand Scenario

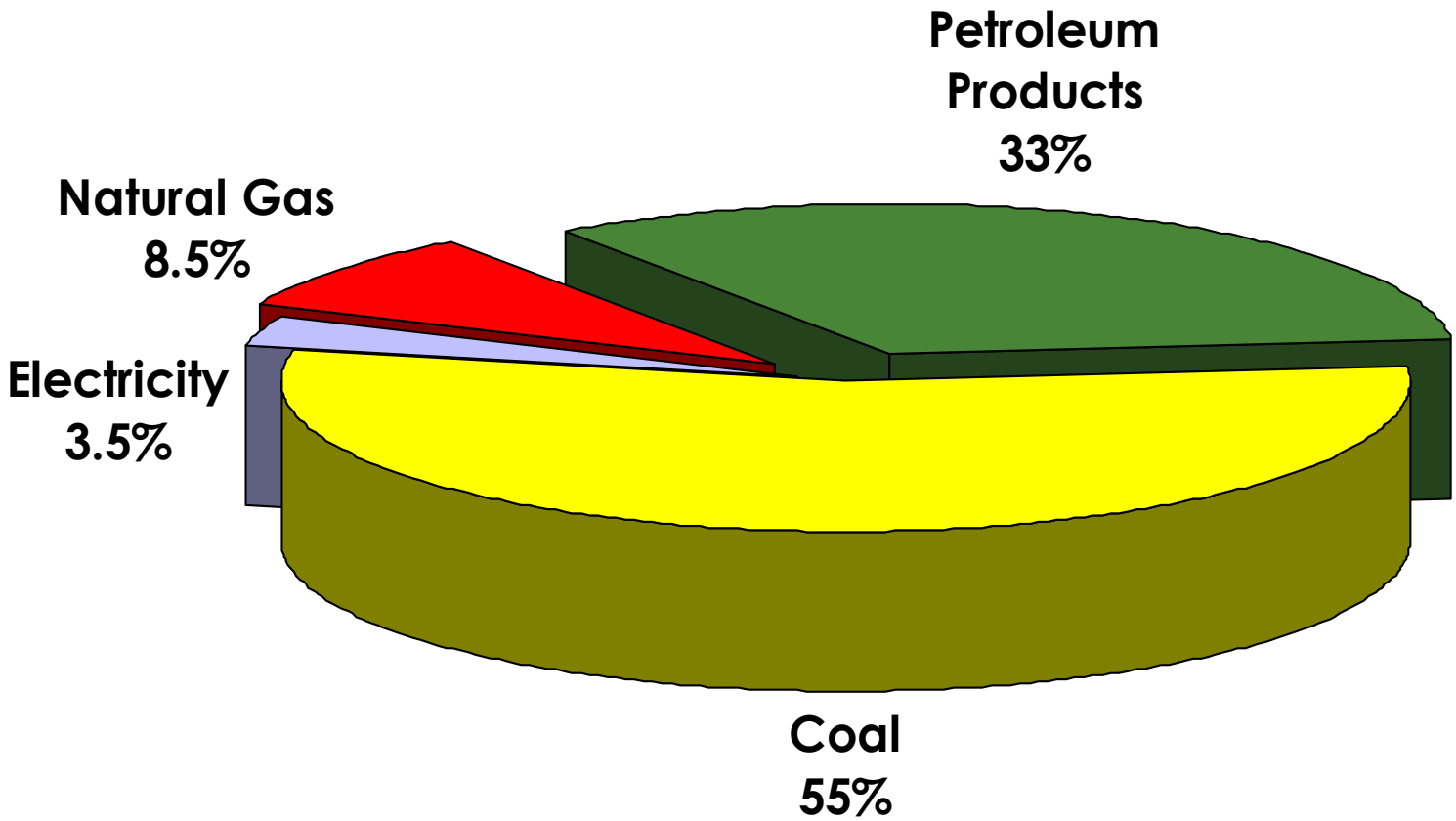
B. Natural Gas Policy

C. Evaluation of New Exploration Licensing Policy (NELP)

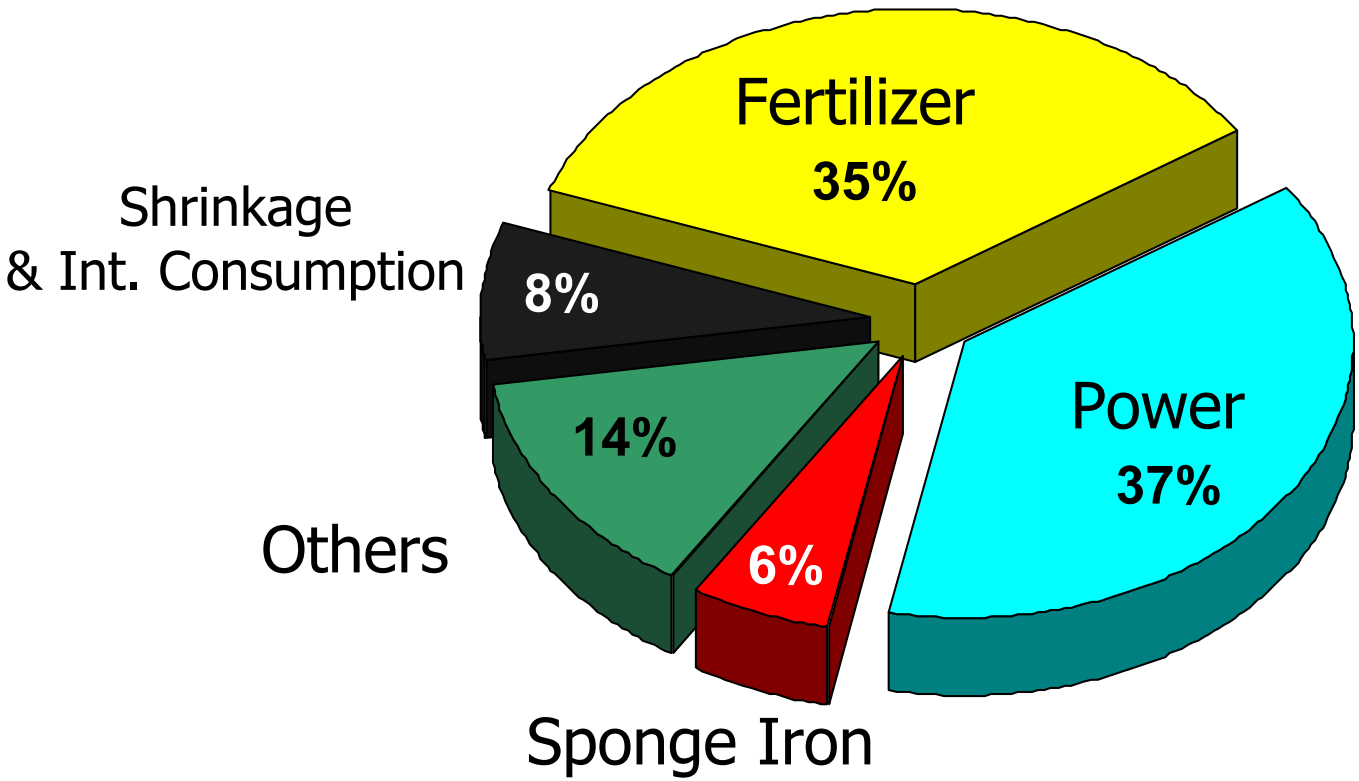
D. Future Opportunities

Natural Gas Supply/Demand Scenario

Primary Energy Supply



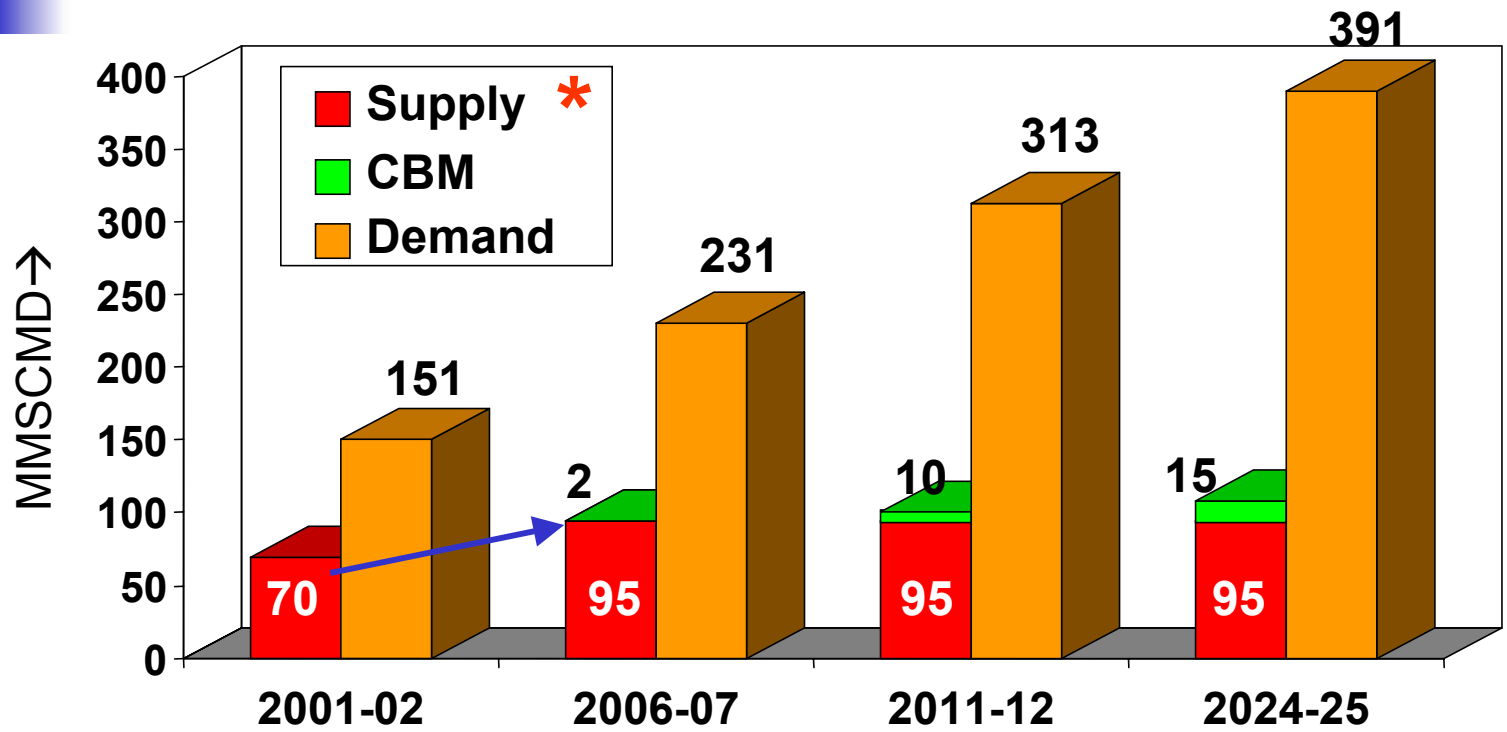
Commercial Gas Usage Pattern



Gas Demand Drivers

- Huge unsatisfied demand
- Capacity enhancement in power sector long overdue
- Increasing demand from fertilizer/ industrial sectors
- Favourable economics of combined cycle gas-based power
- Gas in transport sector - CNG
- Demand by residential/commercial sectors

Natural Gas Demand Supply Projections



* Supply projections on present reserves of conventional gas

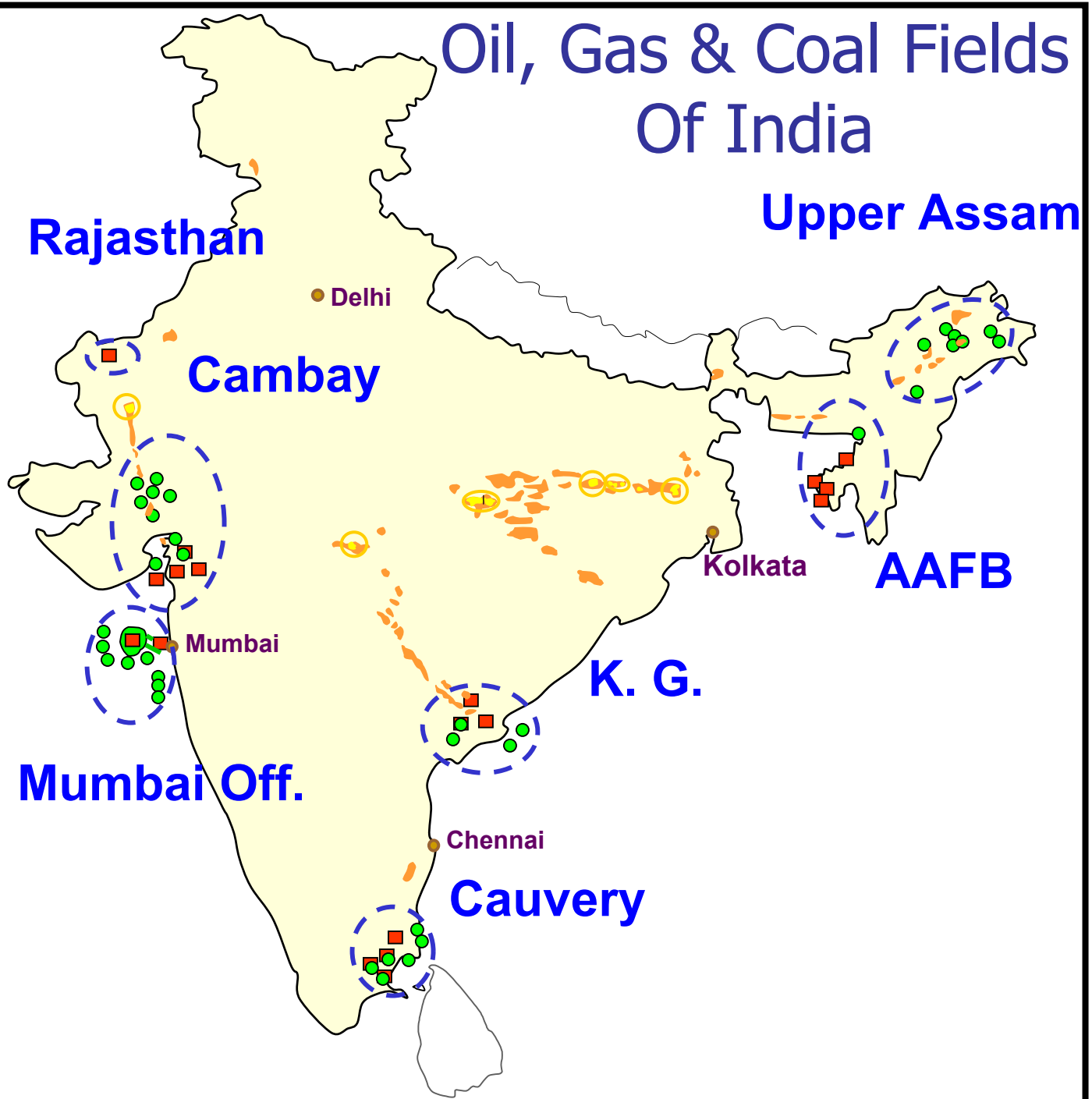
→ 30% increase due to recent discoveries in Pvt./J.V. Sector

Natural Gas Strategies

Bridging the demand-supply gap

- Conventional sources
  - Enhanced domestic production through policy initiatives
- Non - Conventional sources
  - Coal Bed Methane
  - Gas from Gas Hydrates
  - Syn Fuel from Coal by
    - Underground coal gasification
    - Coal liquefaction
- Import of natural gas - transnational pipelines & LNG

Oil, Gas & Coal Fields Of India



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LEGEND

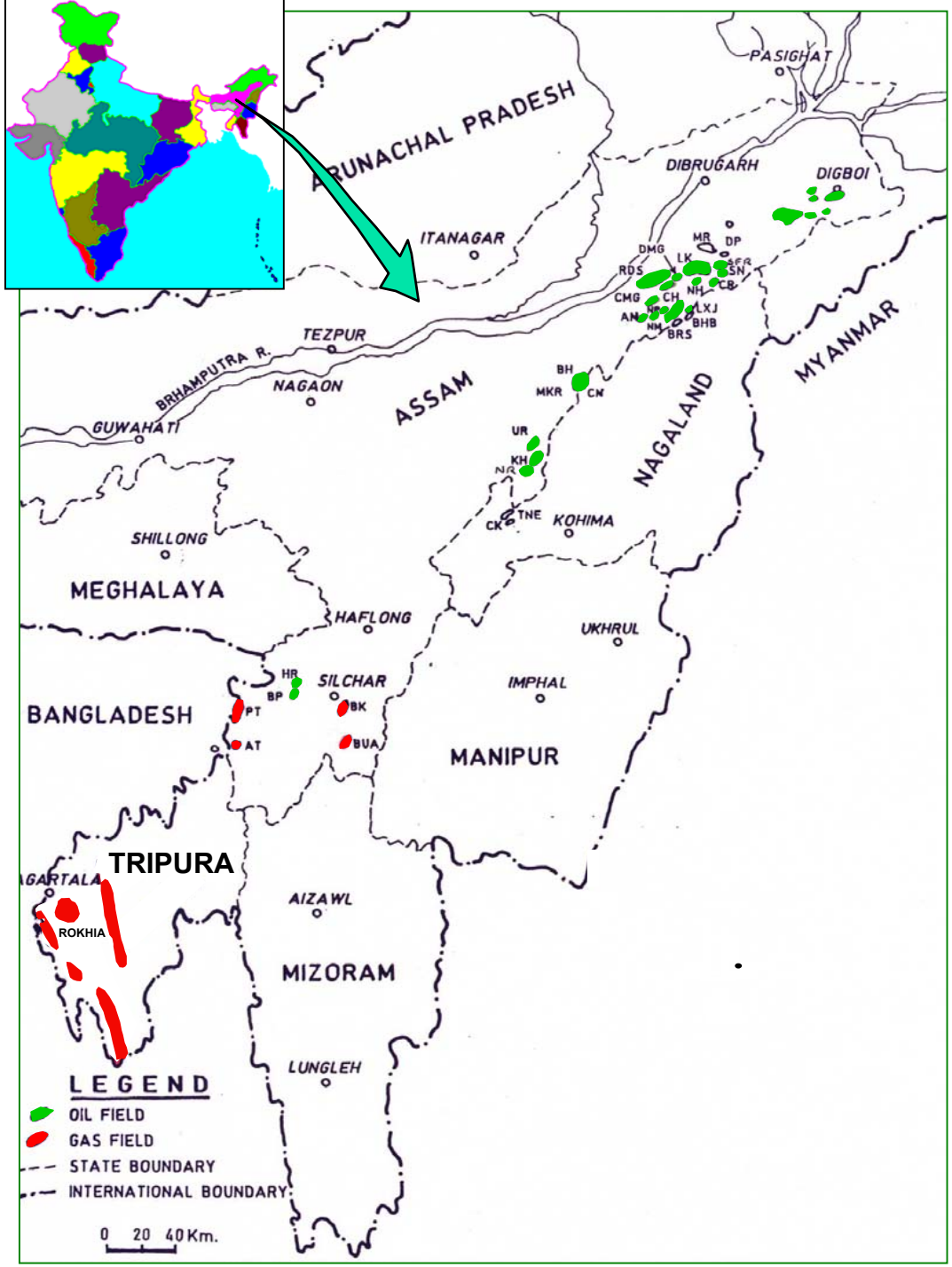
- Oil Fields
- Gas Fields
- Coal Fields

Oil & Gas Reserves Estimates (as on 1.4.02)

	Oil MMT	Gas MMTOE	Total
Geological *(Initial in-Place)*	5,124	1,893	7,017
Initial Recoverable	1,447	1,100	2,547
Balance Recoverable	658	628	1,286
Reserve/Production Ratio *(in Years)*	21	25	-

Total Prognosticated Reserves : 28 billion MT (Oil + OEG)

MMTOE : *Million Metric Tonnes of Oil Equivalent*

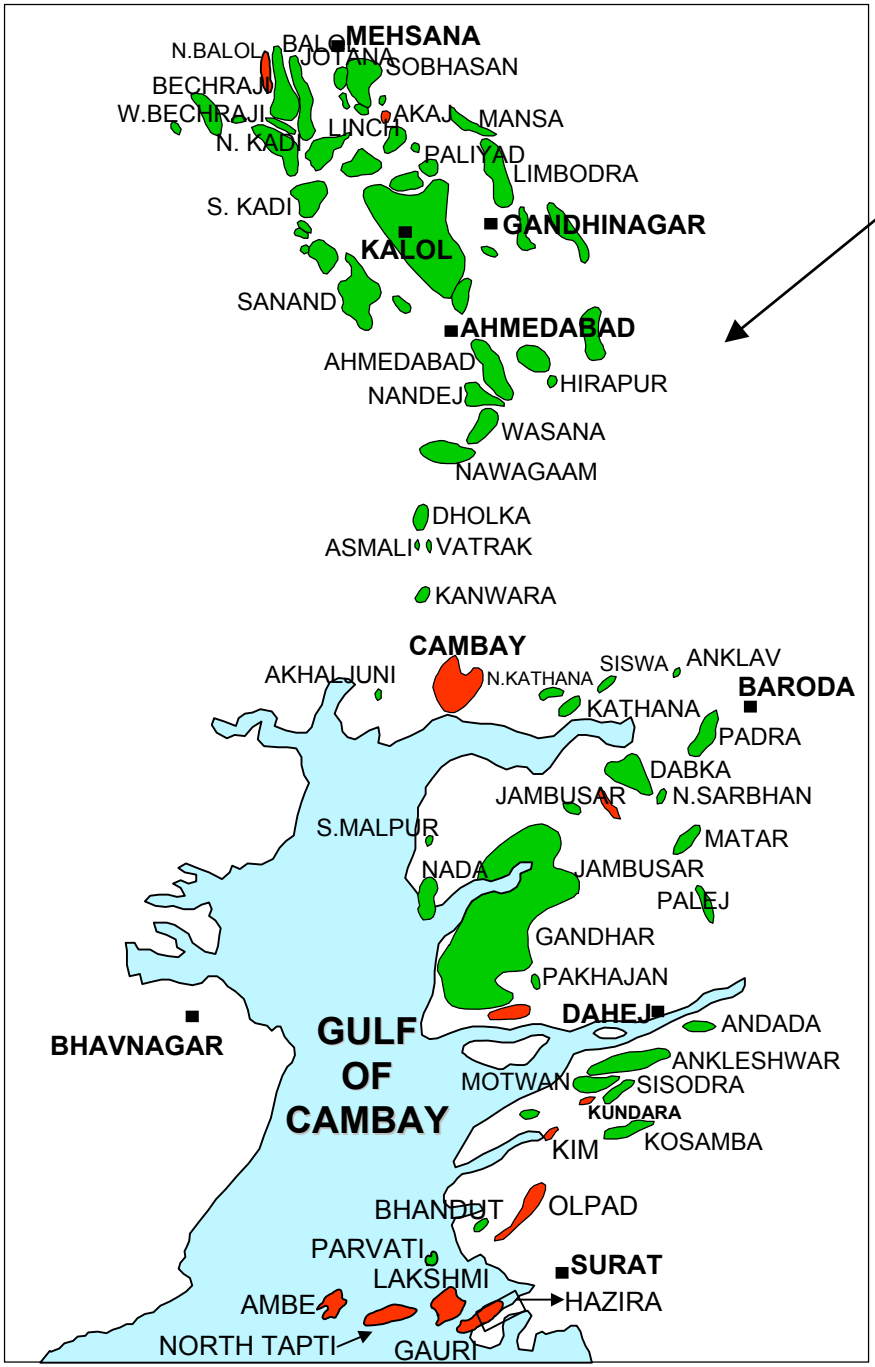


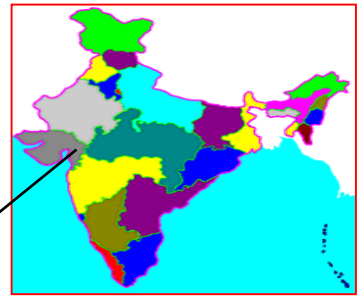
Assam & North Eastern States

MUMBAI OFFSHORE BASIN

LEGEND

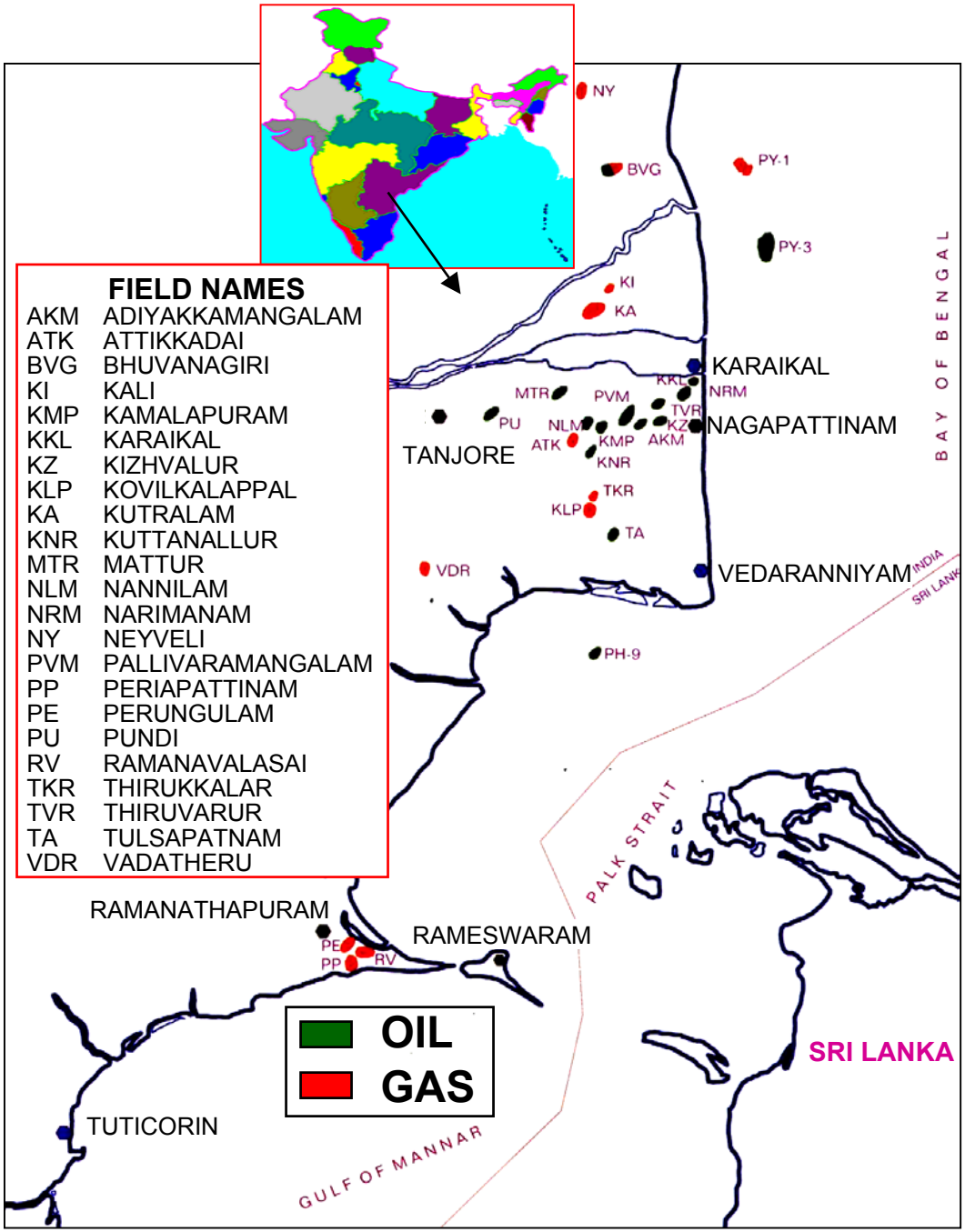
- GAS FIELDS
- GAS FIELDS TO BE PUT ON PRODUCTION IN NEXT FIVE YEAR PLAN





CAMBAY BASIN

CAUVERY BASIN

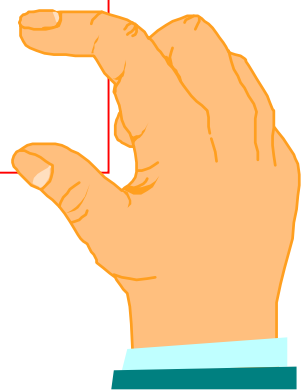


Recent Discoveries & Production Potential

	Block / Field Structure	Production Potential (MMSCMD)
NEW DISCOVERIES		
✓ Gulf of Cambay	Lakshmi (CB-OS-2)	3
✓ Mumbai	Mid & S. Tapti	12
✓ Gulf of Cambay	Hazira etc.	4
✓ K-G Basin	Ravva Satellite Gas Fields & Main Field	2
✓ Deep water East Coast	KG-DWN-98/2 etc.	4
• ***NEW POTENTIAL PROSPECTS***		
✓ Gulf of Cambay	3 Structure (CB-OS-2)	10
		35

Possible increase in gas production in next 3-4 years : 30 %

NATURAL GAS POLICY



INDIA HYDROCARBON VISION : 2025

Exploration & Production Policy : Objectives

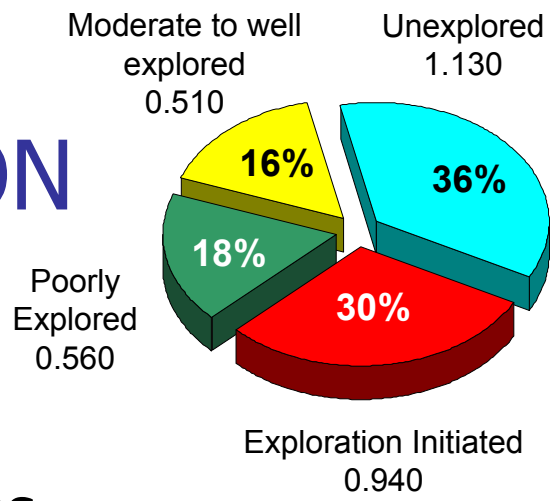
- To have Reserve Replacement Ratio > 1.
- To keep pace with technological advancement and remain in forefront of global E&P industry.
- To achieve as near as zero impact on environment.

Contd…/-

INDIA HYDROCARBON VISION

Exploration & Production Policy

MEDIUM TERM



- Continue exploration in producing basins
- Extensive exploration in non-producing and frontier basins (including deep-sea areas) for new discoveries
- Appraisal of sedimentary basins to the extent of 25% by 2005, 50% by 2010, 75% by 2015 and 100% by 2025.
- Internationally competitive fiscal terms, keeping in view the relative prospectivity of Indian basins, to attract major companies

Contd…/-

INDIA HYDROCARBON VISION : 2025

Natural Gas Policy : Objectives

- To encourage use of natural gas, which is a clean fuel
- To ensure availability by a mix of domestic gas, imports through pipelines and LNG
- To tap unconventional sources like Coal Bed Methane, Natural Gas Hydrates, Underground Coal Gasification etc.

Contd…/-

INDIA HYDROCARBON VISION : 2025

Natural Gas Policy

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MEDIUM TERM

- **Continuous review of gas demand and supply options to facilitate policy interventions**
- **Pursuing initiatives for import of gas from neighbouring countries**
  - **Emphasis on transnational gas pipelines**
- **Import LNG to supplement the domestic gas availability and encourage domestic companies to participate**
- **Expediting setting up of a regulatory framework**

Contd…/-

INDIA HYDROCARBON VISION : 2025

Natural Gas Policy

MEDIUM TERM

- **Provide a level playing field for all players and ensure reasonable transportation tariffs**
- **Put in place an effective structure for the National Gas Hydrates Programme**
- **Maximise economic production of CBM**
- **Formulate National Policy on Underground Coal Gasification**
- **R&D efforts on conversion of gas to liquids**

Alternative Sources of Hydrocarbons

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COAL BED METHANE

GAS HYDRATES

Coal Bed Methane - Indian Initiatives

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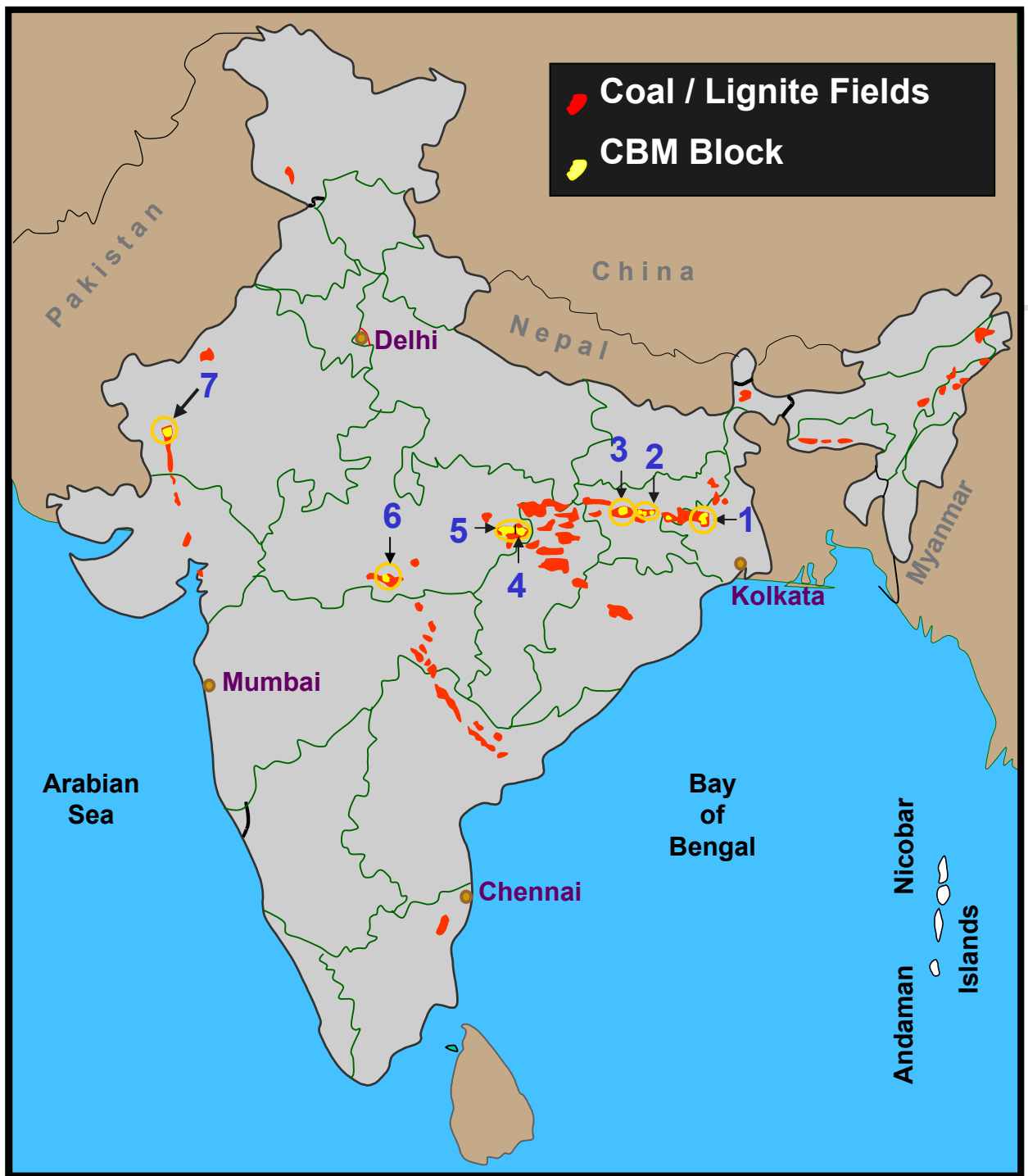
- **CBM Exploration and Exploitation Policy in place – Best Terms in the World**
- **ONGC test-produced CBM from its wells in Jharia Coal Field and is also prospecting for CBM in North Raniganj Coal Field**
- **5 Blocks awarded for CBM**
- **Great Eastern Energy Corpn. exploring for CBM in South Raniganj Coal Field**
- **Ready market, as CBM areas are far away from petroleum producing areas**



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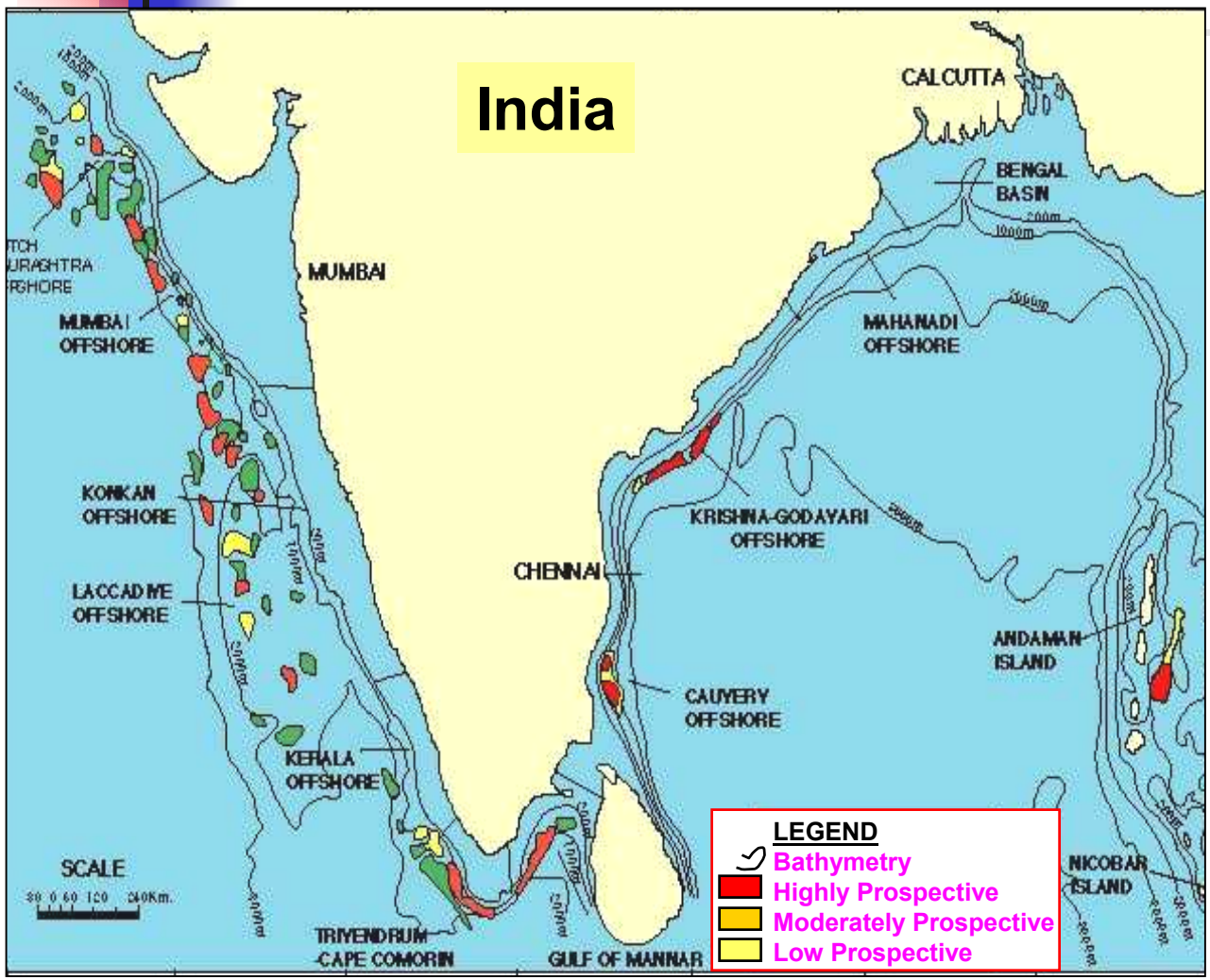
CBM BLOCKS OFFERED UNDER FIRST ROUND OF BIDDING - 2001

Gas Hydrates – the Fuel of the Future

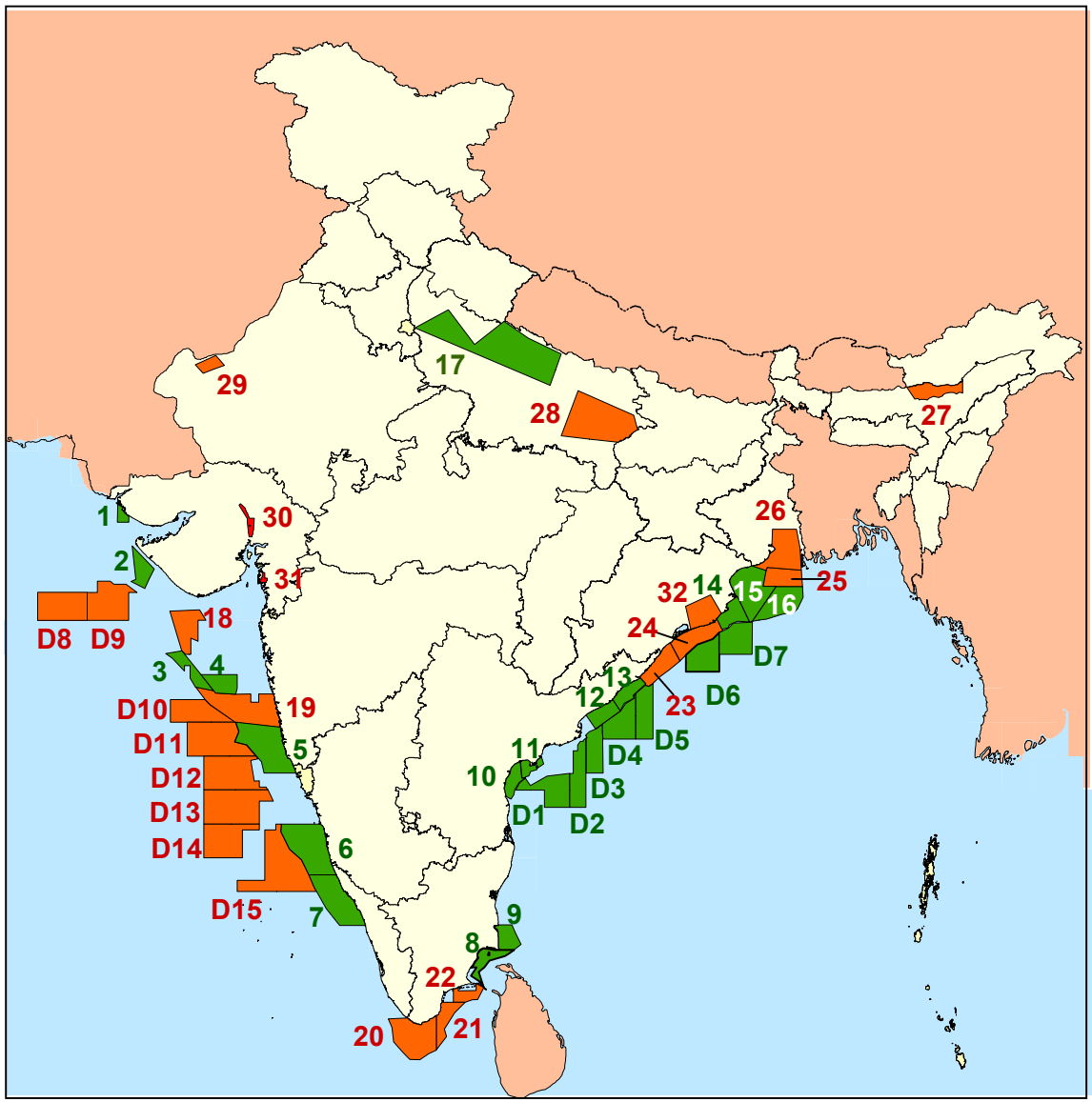
- Indian offshore contains an estimated 1894 TCM of natural gas in the form of hydrates.
- Fresh impetus given by MOP&NG to National Gas Hydrate Programme(NGHP)
  - Technical Committee formed with DGH as Coordinator
  - Several prospective areas mapped
  - Studies along East & West coasts of India to complete by end 2002
- Collaboration with Japan & Canada on international program for Mallik R & D Well in progress

Gas Hydrate Potential Areas
Estimated Resources 1894 TCM



National Gas Hydrate Programme has brought out several prospective areas in Western, Eastern Offshore and Andamans.

SALIENT ACHIEVEMENTS OF NELP



EXPLORATION BLOCKS AWARDED (47)

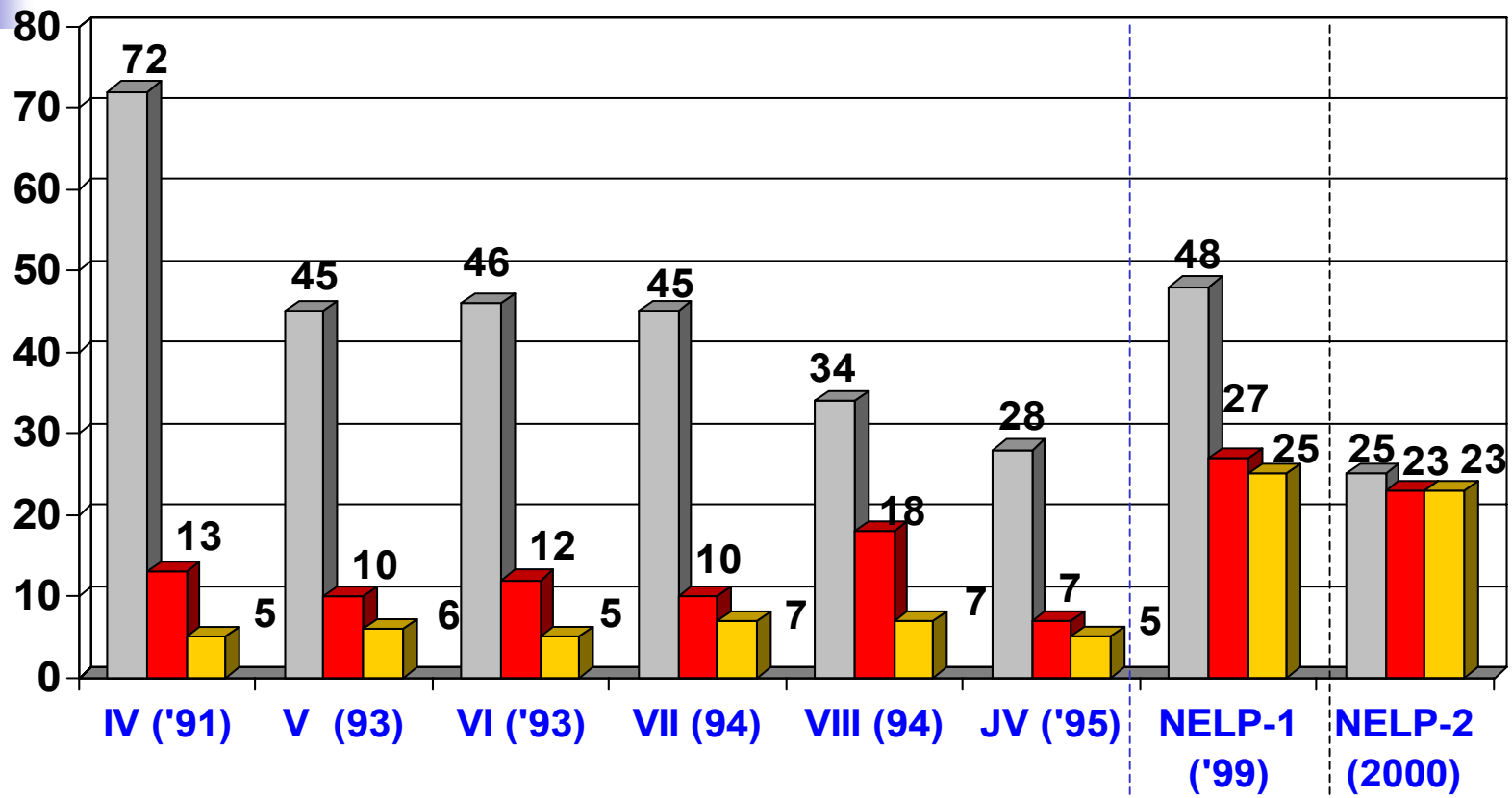
NELP - I

24 Blocks 0.231 M. Sq. Km.

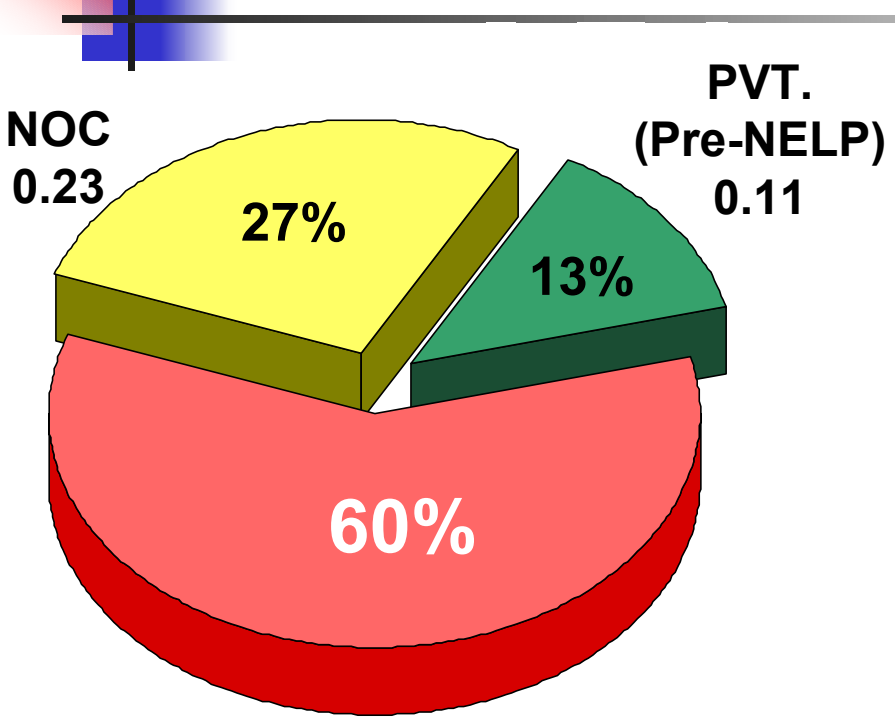
NELP - II

23 Blocks 0.268 M. Sq. Km.

Status of Exploration Rounds

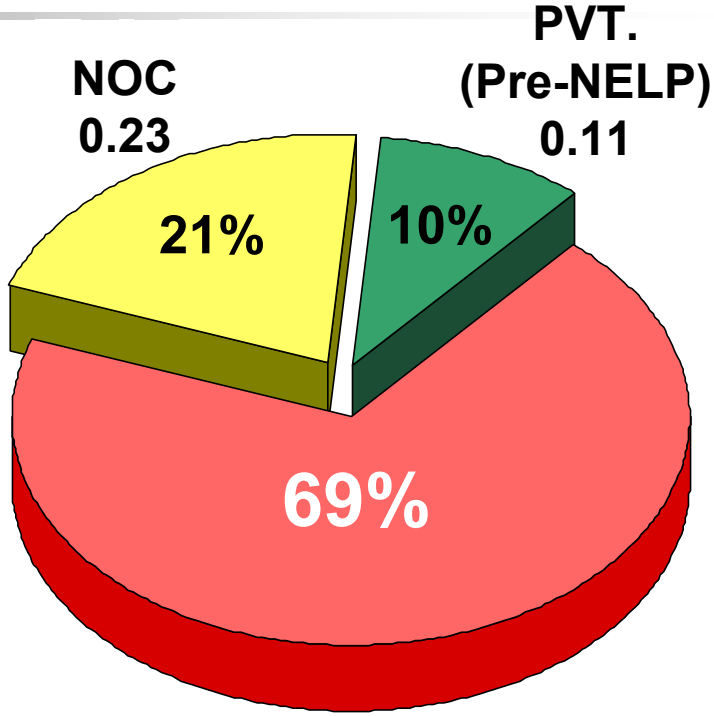


Salient Achievements of NELP



NELP- I & II
0.50

Total Area 0.84 Million sq. kms



NELP- I, II & III
0.76

Total Area 1.10 Million sq. kms

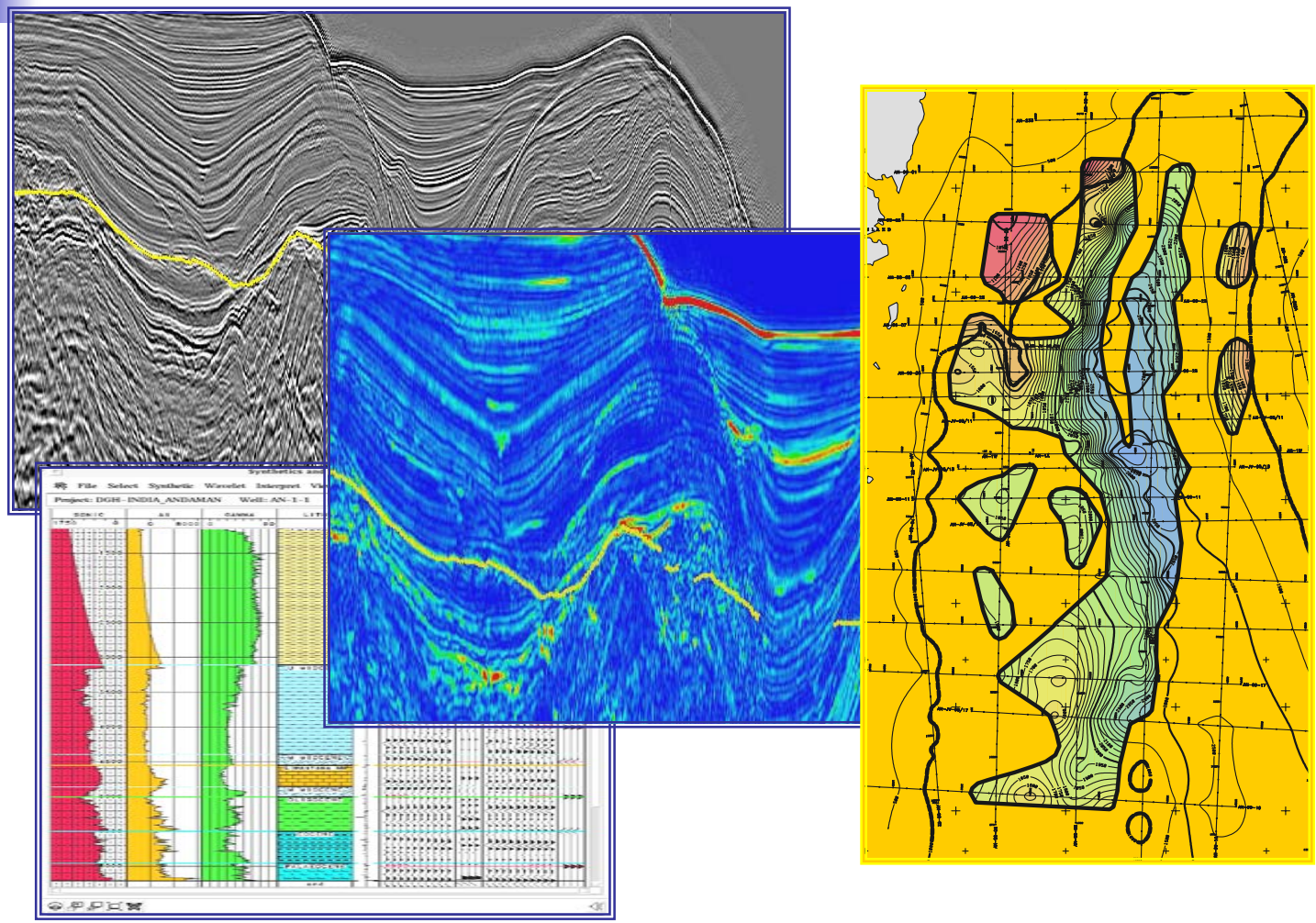
Exploration Activities Completed/ Committed: Pre-NELP vs. NELP

	Pre- NELP	NELP- I & II (Phase-I)
2D Seismic Survey	13949 LKM	55215 LKM
3D Seismic Survey	1542 SKM	22065 SKM
Exploratory Wells	17	72
No. of Discoveries	6 (1992-2001)	3 (2000-01)
Investment made / committed	369 million US $	532 million US$

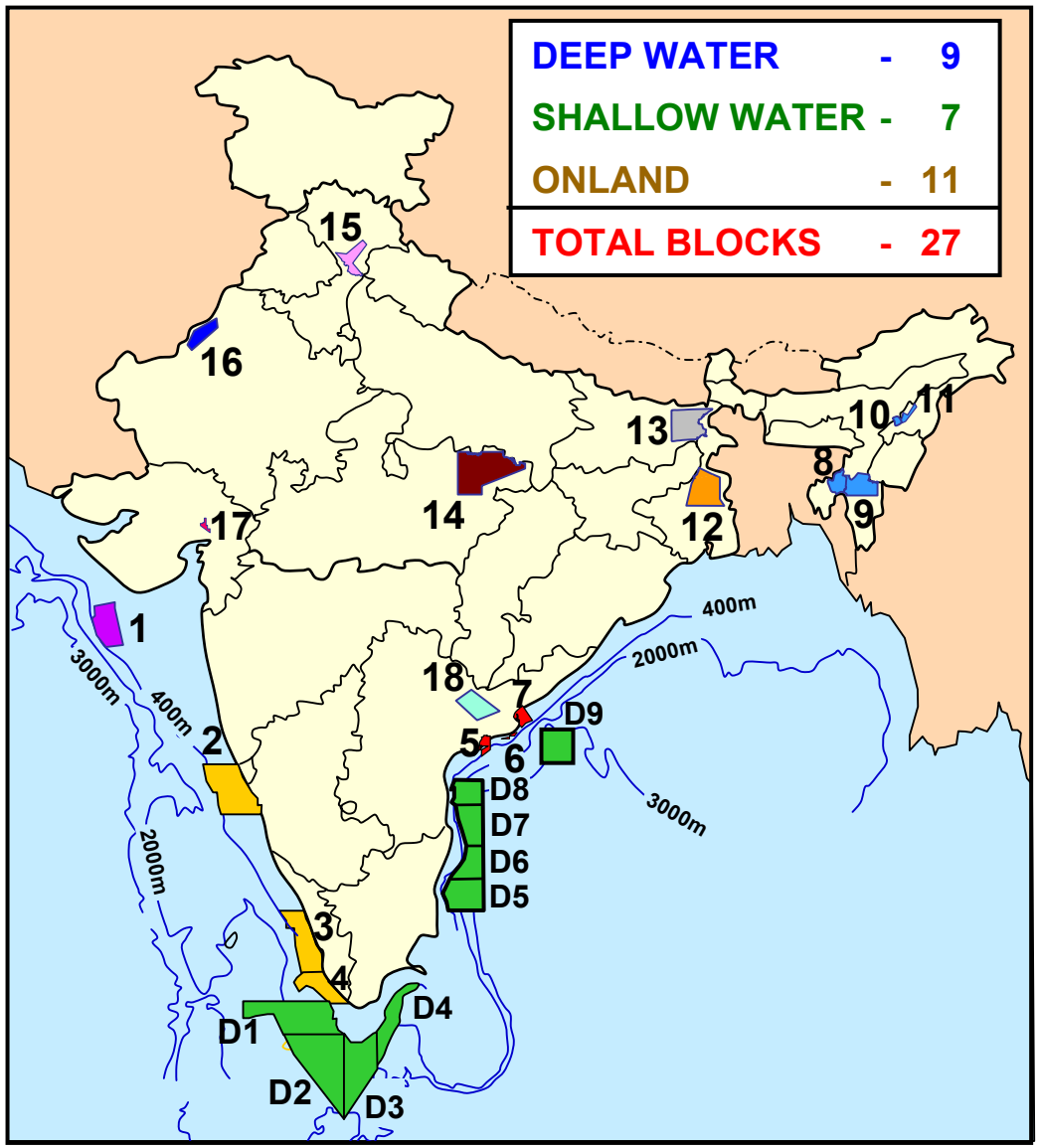
Salient Achievements of NELP

- Award of blocks in record time
- Deep water blocks offered for the 1st time and discoveries made within a year
- Information Dockets & Data Packages in digital form instead of hard copies earlier
- Competitive environment created, which led to very aggressive exploration programs & better commercial terms for the Government

Future Opportunities under NELP



Exploration Blocks on offer under NELP-III



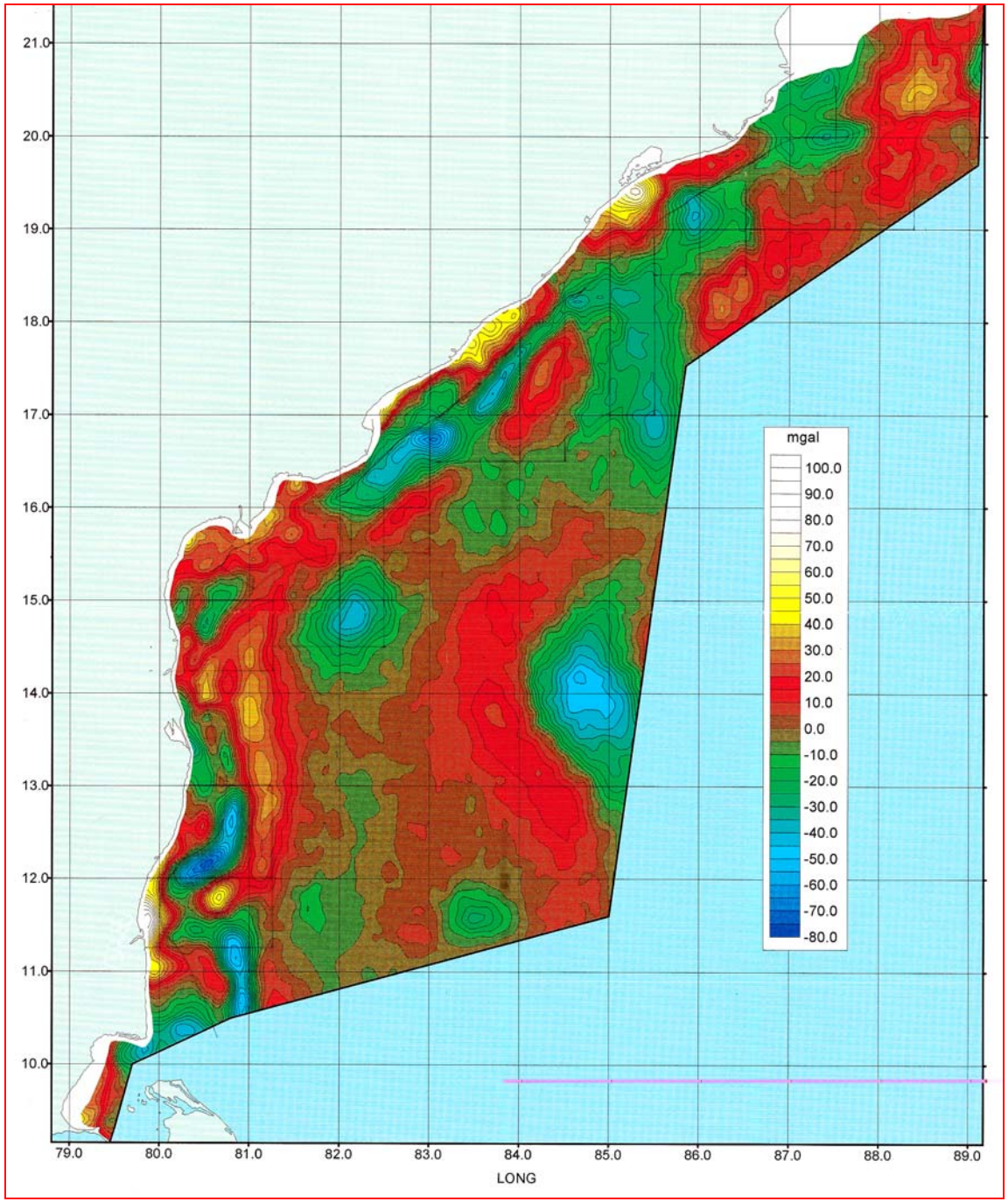
DEEPWATER

SHALLOW WATER

- SAURASHTRA
- KERALA-KONKAN
- KRISHNA-GODAVARI

ONLAND

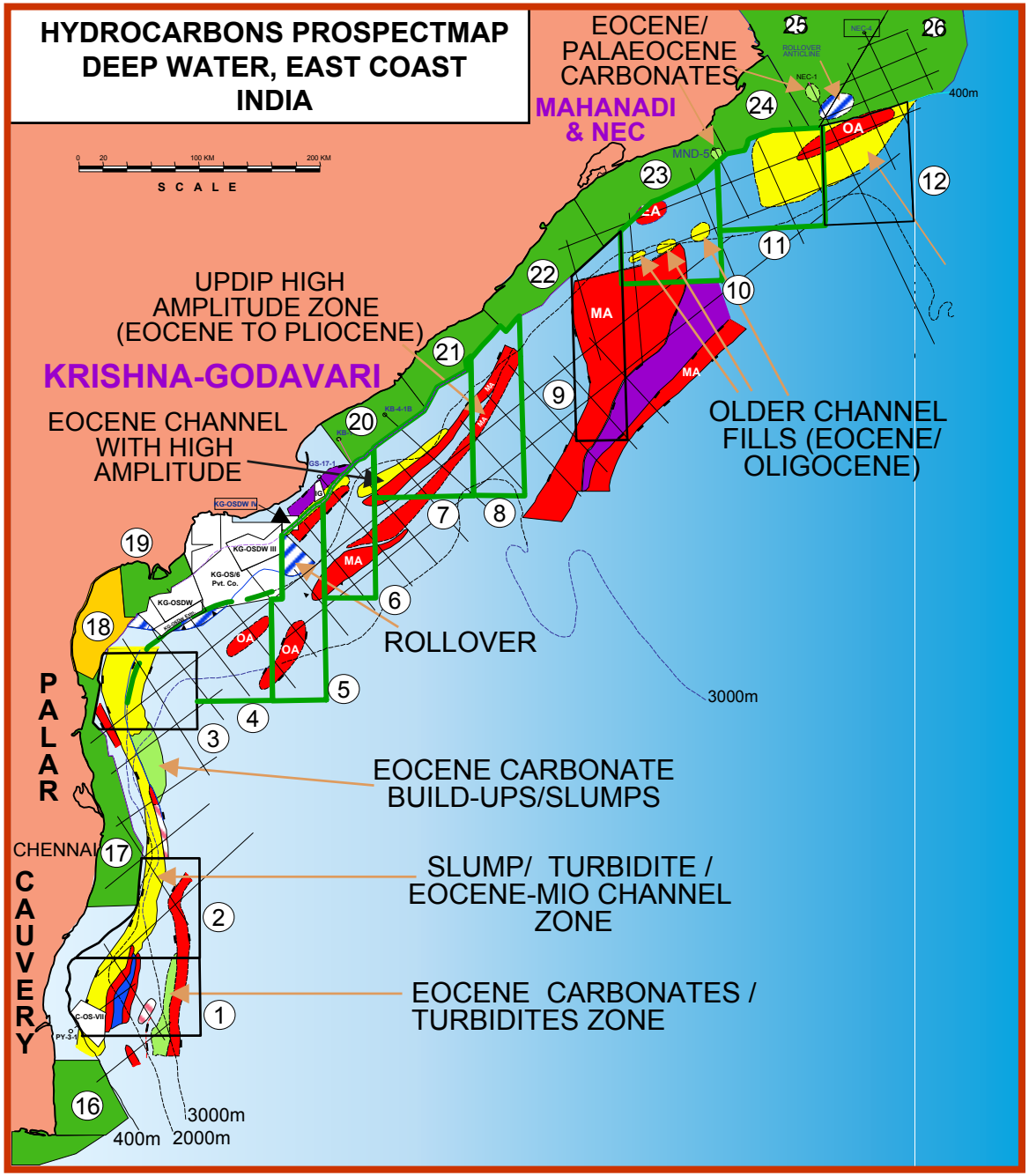
- ASSAM-ARAKAN
- BENGAL
- PURNEA
- VINDHYAN
- HIMALYAN FORELAND
- RAJASTHAN
- CAMBAY
- PRANHITA-GODAVARI



Satellite Gravity Map

EAST COAST

- Reconnoitry survey Area: 0.545 million sq. km



Prospect Map

INDEX

- MA — MIOCENE ANTICLINE
- OA — OLIGOCENE ANTICLINE
- EA — EOCENE ANTICLINE
- HORST FEATURE
- VOLCANIC HIGH (?)
- STRUCTURAL HIGH
- STRUCTURAL LOW
- CHANNEL / SLUMP / TURBITIDE DEPOSIT ZONE
- CARBONATE BUILD UP/SLUMP
- 1 — DEEP WATER BLOCK
- 16 — NELP BLOCKS UPTO 400m
- AWARDED PEL BLOCKS
- JV SPEC. PROFILE

Potential Prospects Identified in Southern Tip

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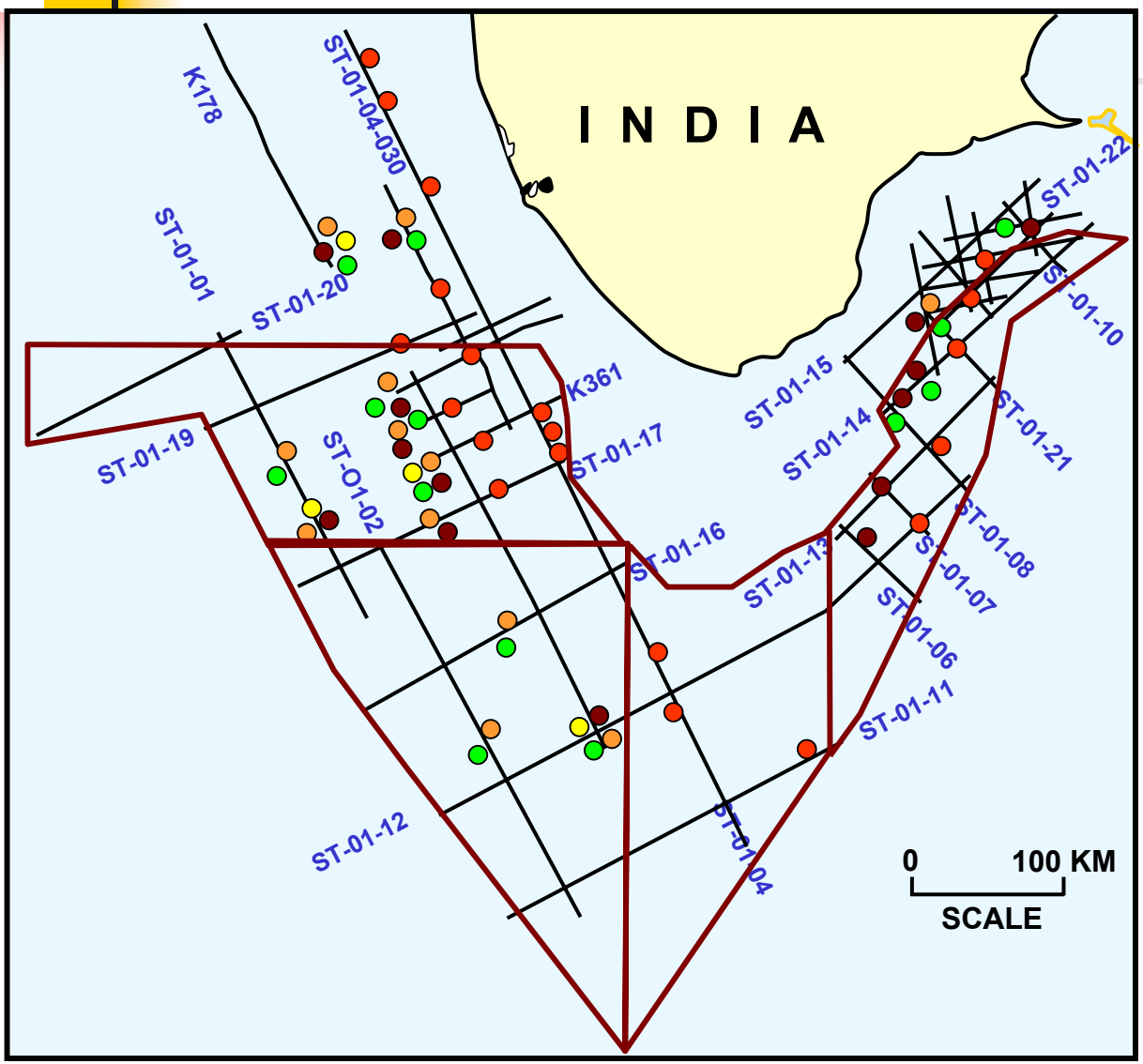
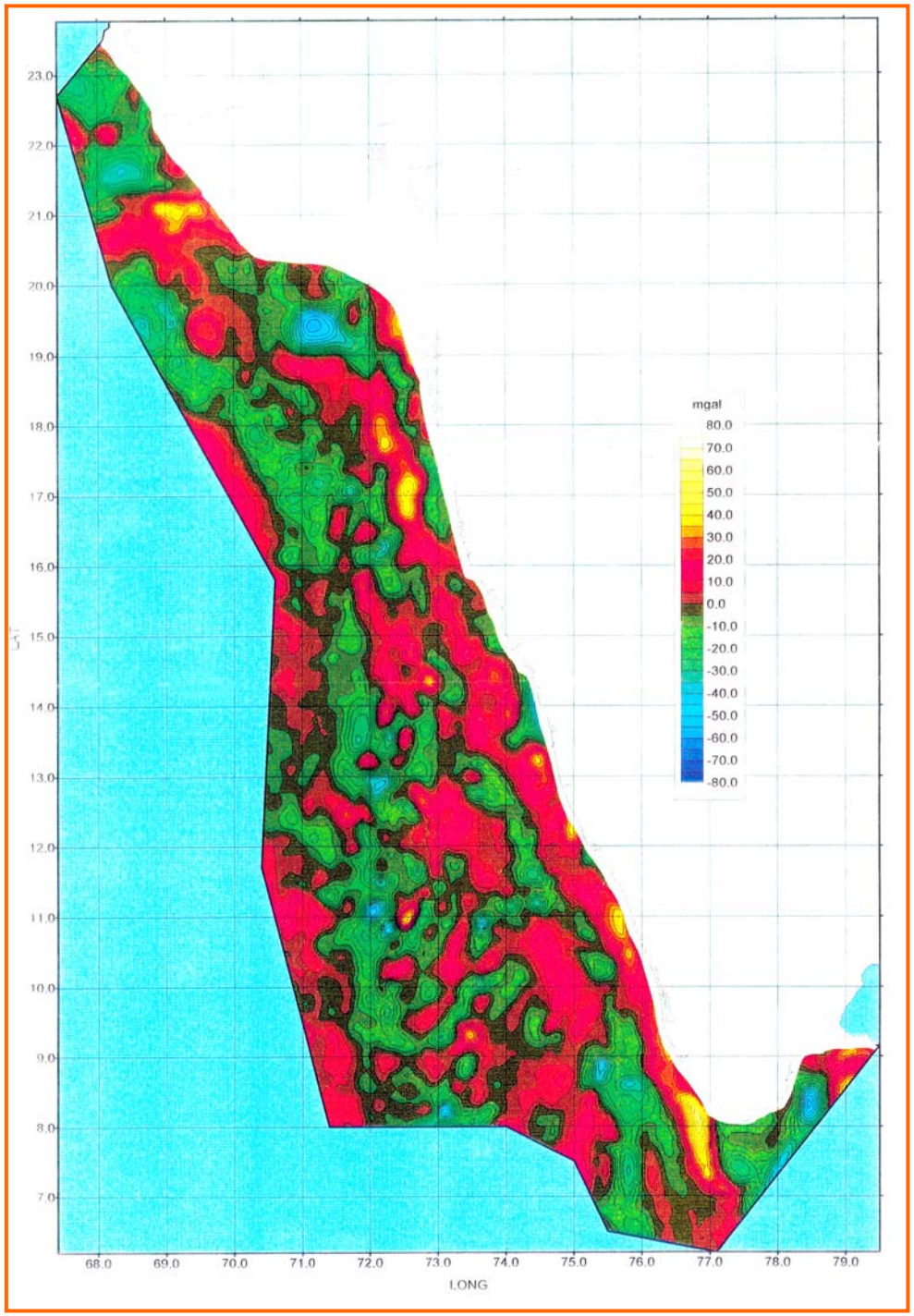
ABOUT 50 LEADS IDENTIFIED



- MIO. STRUC. TRAPS
- OLIGO. STRUC. TRAPS
- EOC. STRUC. TRAPS
- PRETERT. STRUC. TRAPS
- MIO. CARBONATES



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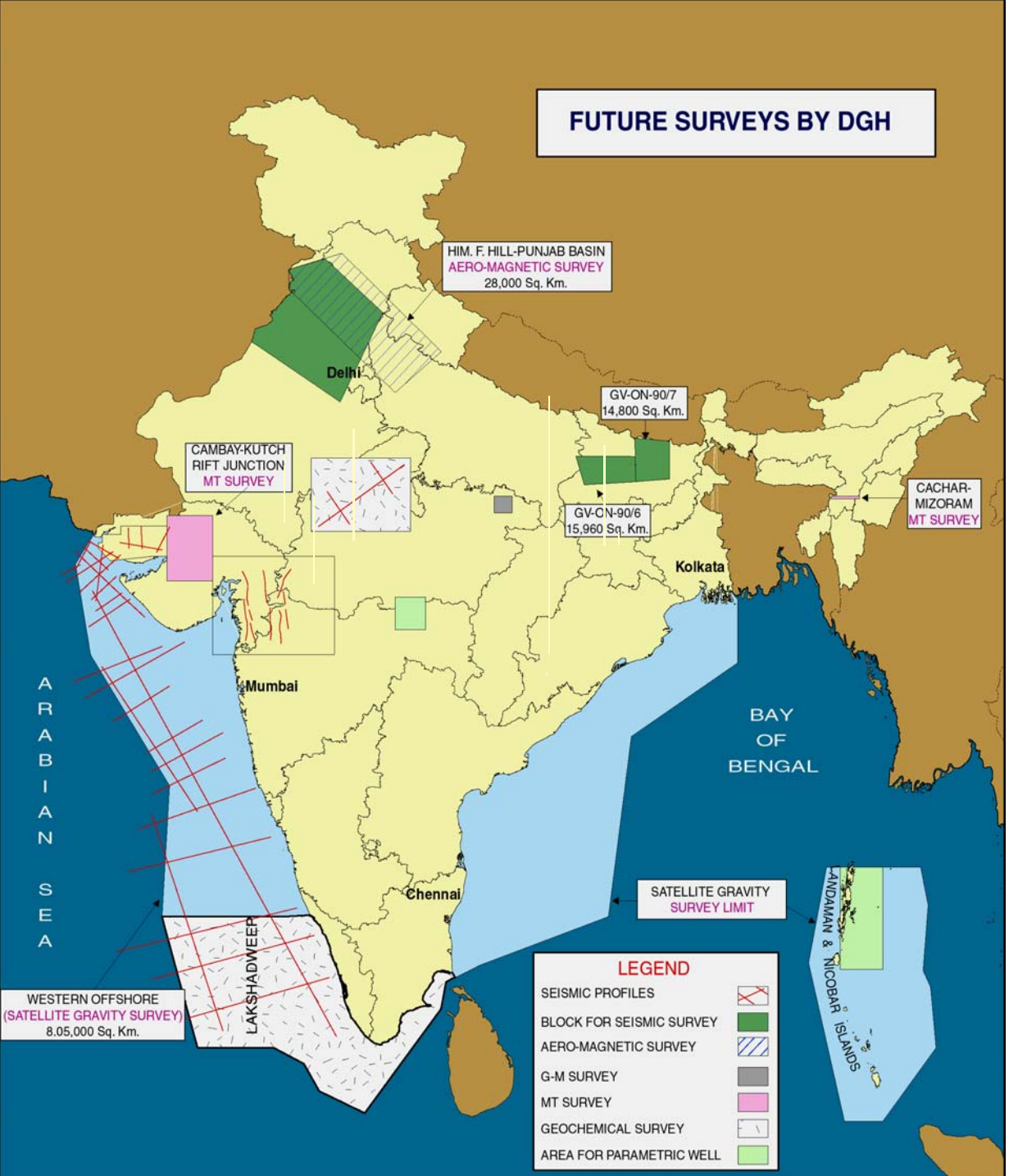
Satellite Gravity Map

WEST COAST

- Reconnoitry survey Area: 0.805 million sq. km



FUTURE SURVEYS /STUDIES BY DGH

Thank you